

# 2011

## Arizona Drought Preparedness Annual Report



Arizona Department of  
Water Resources

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# 2011 Arizona Drought Preparedness Annual Report

## Acknowledgements

The Arizona Department of Water Resources wishes to thank the State Monitoring Technical Committee and the Local Drought Impact Groups for contributions to this report.

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## Introduction

Realizing the need for drought preparedness in Arizona, a Governor's Drought Task Force was created in 2003 and the *Arizona Drought Preparedness Plan* (ADPP) developed. The ADPP was adopted in 2004 and its continued implementation ordered in 2007 (EO 2007-10). The ADPP established a framework to monitor drought, improve understanding of drought impacts, and determine mechanisms for limiting future vulnerability. The Arizona Department of Water Resources coordinates these activities and prepares the *Arizona Drought Preparedness Annual Report* each year. The *2011 Arizona Drought Preparedness Annual Report* covers the drought conditions and preparedness activities for the 2011 water year, from October 1, 2010 through September 30, 2011.

# 1. Drought Status Summary

## Winter Precipitation

The winter of 2011 (Figure 1) was extremely dry across all but the northwestern corner of Arizona due to a La Niña circulation, which forced most winter storms to remain well north of our state. The Verde River watershed received near average precipitation, though it has little storage capacity. The Salt River watershed, which has significant storage capacity, received only 50 to 70% of average precipitation. The southeastern watersheds were exceptionally dry with less than 50% of average winter precipitation. The only good news about the 2011 winter precipitation was the near record run-off from the upper Colorado River basin into Lakes Powell and Mead. The run-off allowed equalizing flows to raise Lake Mead about 41 feet above critical shortage level, while Lake Powell rose 42 feet. This is critical to the Arizona communities that draw on Colorado River water from the Central Arizona Project. Arizona's sparse winter precipitation followed a near average to slightly wetter than average winter in 2010 (Figure 2). The 2010 winter left moisture deficits in the southeastern counties, which became much more critical this winter and through the summer. Temperatures during the winter were generally near average over the northwestern half of the state and two to three degrees warmer than average across the southeastern half of the state. This resulted in a reduction of the snowpack in the White Mountains on the upper Salt River watershed.

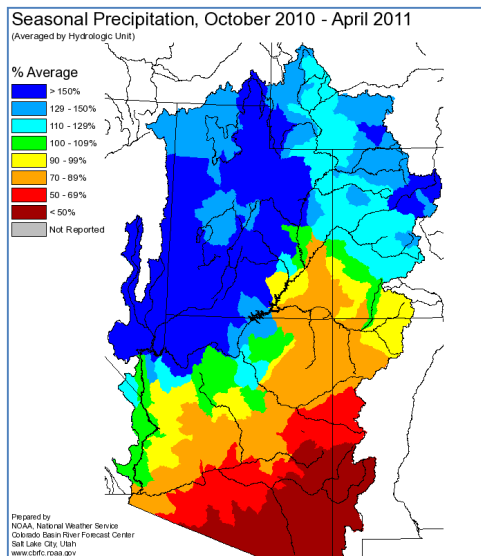


Figure 1. – Winter 2011 Precipitation

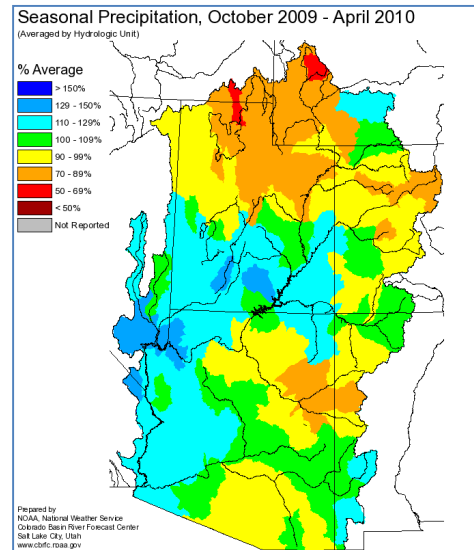
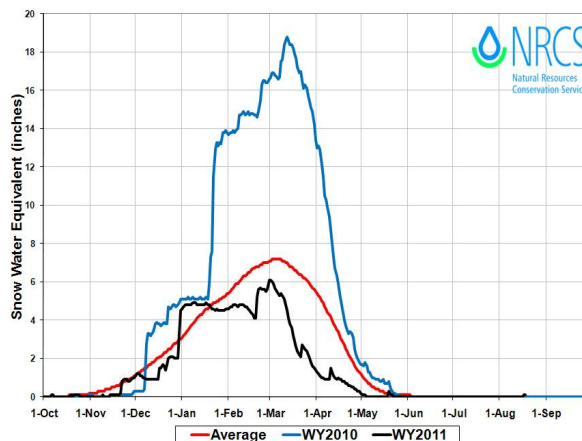


Figure 2. – Winter 2010 Precipitation

At nearly all USDA-Natural Resources Conservation Service (NRCS) automated snow telemetry (SNOTEL) sites, the snowpack (as snow water equivalent) during the winter snow season was well below normal. This is in stark contrast to the snowpack of the previous winter (Figure 3).

Figure 3. Snow water equivalent at high-elevation gages compared to long-term average

### Arizona Snowpack Summary



## Summer Precipitation

The 2011 summer (Figure 4) was wetter than average on the Little Colorado, San Pedro and Virgin watersheds; much drier than average on the Bill Williams, Agua Fria and San Simon watersheds; and near or slightly drier than average on the other nine watersheds. Summer precipitation was very localized, with individual storms dropping half an inch to an inch of rain in one location and less than a tenth of an inch a few miles away. The southeastern watersheds did not receive enough rainfall this summer to make up for the deficits left by the dry winter. The change from last summer is quite dramatic, particularly in the southwestern deserts and in the eastern watersheds (Figure 5). The monsoon was relatively short, but was augmented by several early fall-type cold fronts that brought much needed rainfall to northern Arizona, leaving Flagstaff with near average precipitation for the water year. Unfortunately, those storms did not bring rainfall to central or southern Arizona. The dry monsoon was largely due to the location of the subtropical high well eastward of its normal location. This persistent high pressure moved the moisture to the eastern border of Arizona, and also created intolerably hot conditions over Texas and Oklahoma.

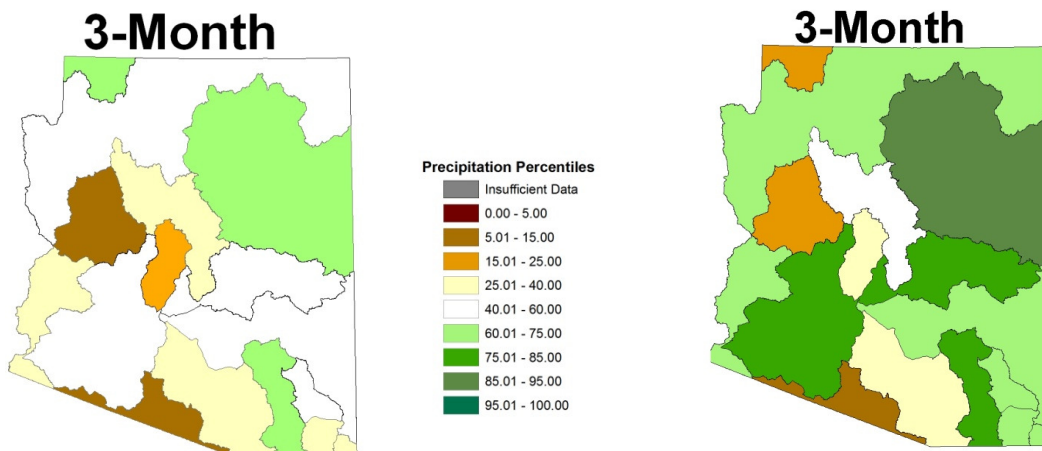


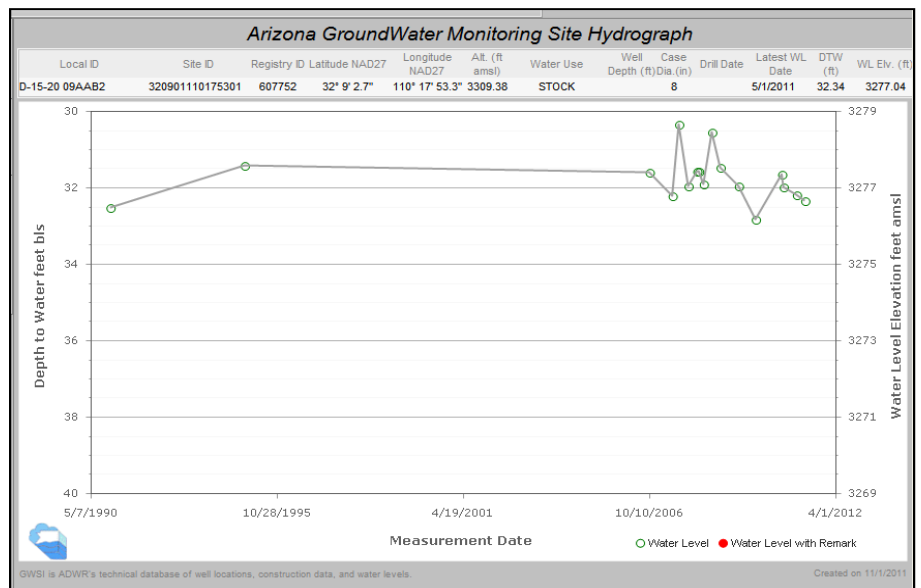
Figure 4. Precipitation Jul - Sep, 2011

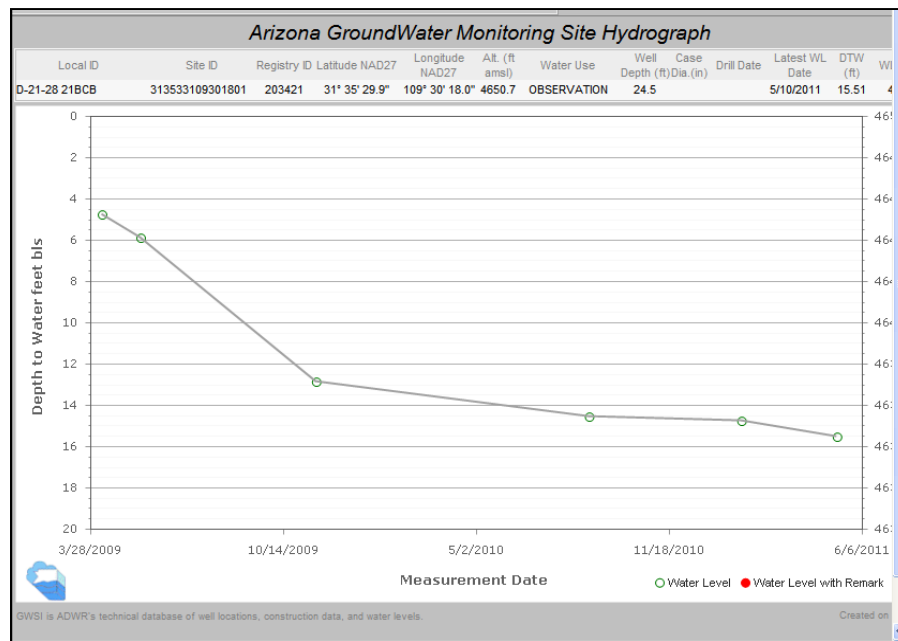
Figure 5. Precipitation Jul - Sep, 2010

## Drought Index Wells

Two of the Arizona Department of Water Resources' (ADWR) groundwater index wells in the southeastern part of the state have been identified as meeting the criteria for measuring the effects of climate for the purpose of providing an indication of drought status. These wells are located within the Lower San Pedro and Whitewater Draw watersheds. During the 2011 water year, the wells showed a steady decline in groundwater levels that correlated with stream flow and long-term drought conditions, as indicated by the hydrographs in Figure 6 and Figure 7.

Figure 6. Drought index well in the Lower San Pedro watershed



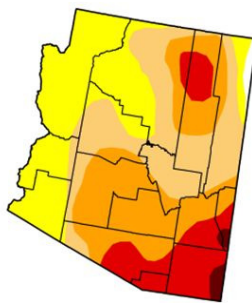


**Figure 7. Drought index well in the Whitewater Draw watershed**

## **Drought Status Changes**

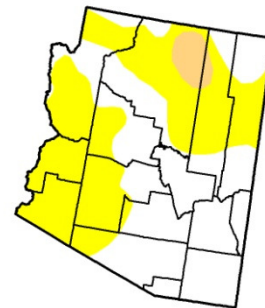
Arizona's drought status is updated at the end of each month (short-term drought status) and the end of each quarter (long-term drought status).

### ***-Short-term Drought Status***



**Intensity:**

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional



**Figure 8. Short-term drought status Oct. 25, 2011**

**Figure 9. Short-term drought status Oct. 26, 2010**

In the short-term, rangeland and forest conditions are in much worse condition than a year ago (Figures 8 and 9). Though summer precipitation was not widespread or uniform, the current status actually is somewhat improved from the mid-summer condition where extreme drought (D3) extended west and north covering all of Graham and Greenlee, southern Gila, and western Pinal and Pima counties, and exceptional drought (D4) covered all of Cochise and southern Graham and Greenlee counties. The current status is a result of both the dry winter and the weak monsoon. In most of the southwestern counties there was no spring green-up. A year ago, over half the state was out of short-term drought condition, but this year 100% of the state is in some drought condition, with 42% in severe drought or worse. So far, there has been no significant fall precipitation, so there may be no winter grasses in many areas. This will be important as we move into a second consecutive La Niña winter for 2011– 2012 that is forecast once again to be drier than normal.



## -Long-term Drought Status

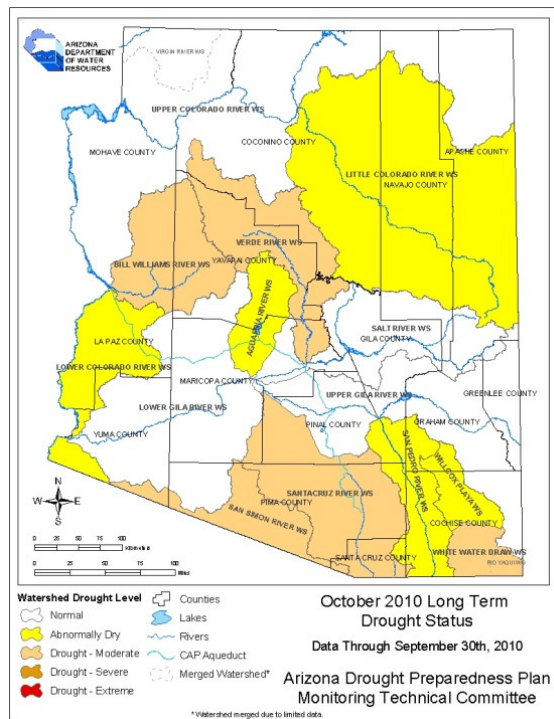


Figure 10. Long-term drought status Oct. 2011

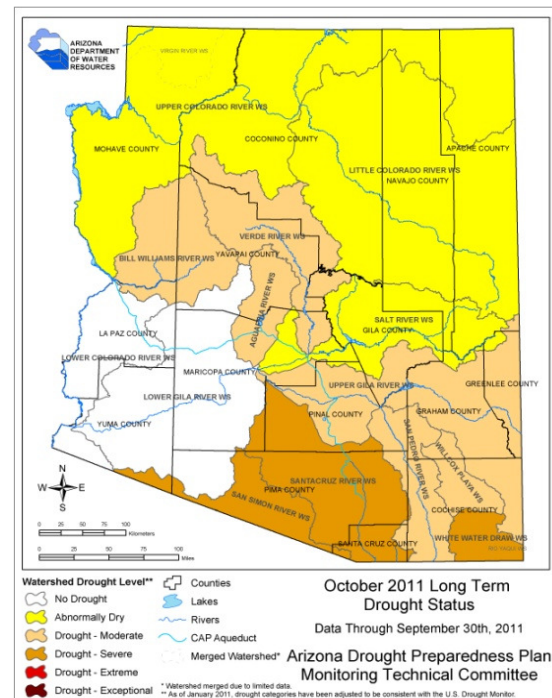


Figure 11. Long-term drought status Oct. 2010

In the long-term, there has been significant degradation from a year ago both in northern Arizona and in the southeastern watersheds (Figures 10 and 11). Last year, due to the extremely wet winter caused by the El Niño circulation pattern, there was significant improvement in the long-term drought status, but the past 12 months have been so dry that many of the long-term gains from the previous year have been erased. The Upper Colorado and Salt River watersheds have moved back to abnormally dry from no drought, and the conditions in the southeastern watersheds have degraded by one or two categories, with the Santa Cruz, Whitewater Draw and San Simon watersheds now in severe drought. On the Drought Monitor, these watersheds and the southeastern counties are in extreme drought. Only the lower Colorado watershed has improved from abnormally dry to no drought. The Lower Gila watershed continues to be without drought. With the current outlook indicating a repeat of La Niña conditions, we anticipate worsening drought conditions this winter.

Table 1. Number of watersheds in each drought category

Category	2011	2010
No Drought	2	4
D0 - Abnormally Dry	3	5
D1 – Moderate Drought	6	6
D2 – Severe Drought	3	0
D3 – Extreme Drought	0	0
D4 – Exceptional Drought	0	0

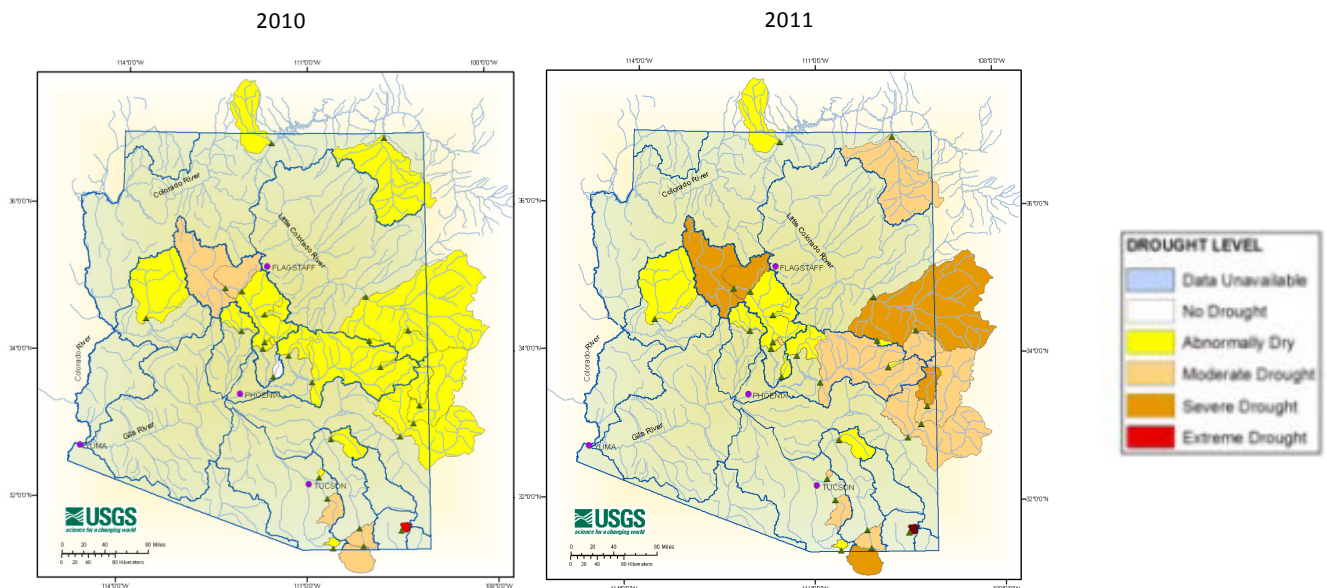
## Water Year Summary

At SNOTEL and other mountain gages, cumulative precipitation for the 2011 water year (ending September 30) was below normal to well below normal in all of the state's major river basins, ranging from 65 to 95% of the 30-year average (Table 2).

**Table 2. Mountain precipitation for water year 2011**

River Basin	Percent of 30-yr. average Precipitation at NRCS high elevation gages	
	2011	2010
Salt River Basin	75%	109%
Verde River Basin	95%	117%
Little Colorado River Basin	85%	120%
San Francisco-Upper Gila River Basin	65%	104%

Drought status as indicated by streamflow data shows a slight increase in drought from 2010 to 2011. Basins that increased in drought did so by only one or two drought categories. Out of the 26 basins, twelve stayed the same, twelve increased by one drought level and two basins increased by two drought levels. Overall condition for the 2011 water year is moderate drought.



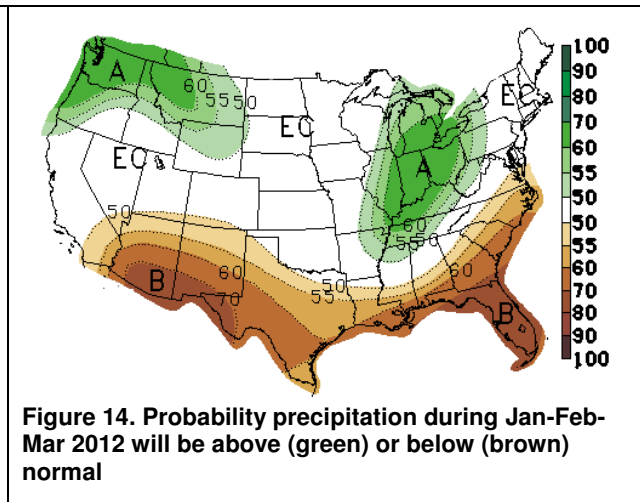
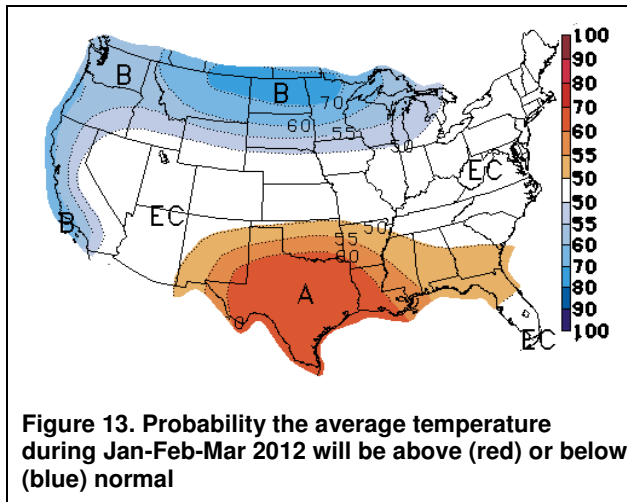
**Figure 12. As determined by USGS stream gages, overall drought condition increased one category from 2010 to 2011**

## Outlook for 2011-2012

### -Winter 2011-2012

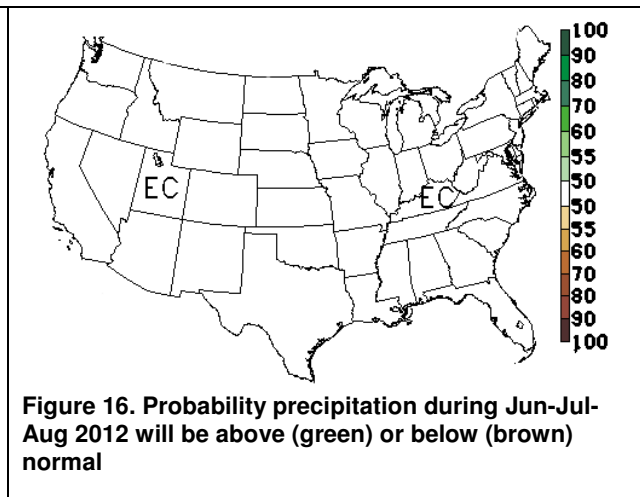
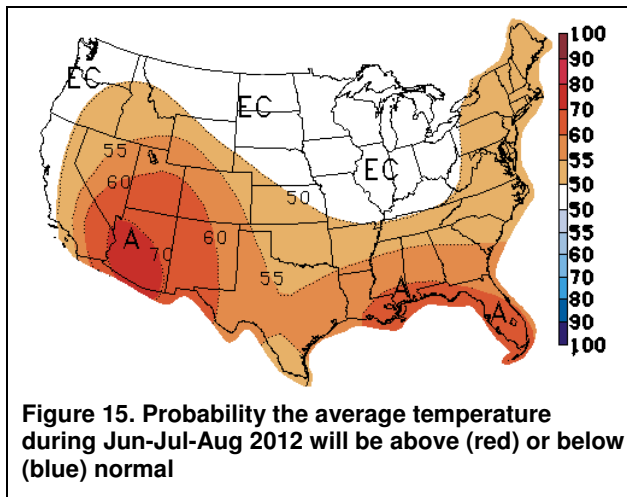
After a strong La Niña event during the 2010-2011 winter, conditions became neutral during the 2011 summer. Since then, the equatorial waters of the Pacific Ocean have slowly but steadily cooled. The majority of climate models now indicate that La Niña conditions will re-emerge during the coming winter months. La Niña conditions *typically* result in below average winter precipitation across the southwestern United States.

Official climate outlooks from the NOAA Climate Prediction Center indicate the chances of temperature and precipitation being either above or below normal. The outlook for January-March 2012 shows an equal chance for the three month average temperature to be above or below normal across Arizona. The precipitation outlook indicates that statewide, below normal precipitation is favored January-March 2012, with the probability ranging from near 55% across far northern Arizona to near 75% across southeast Arizona. This will likely cause existing drought conditions to worsen through the typically wet winter months.



### -Summer 2012

The Climate Prediction Center's climate outlook for June-August 2012 shows a high likelihood that the average temperature during those three months will be above average statewide. The precipitation climate outlook shows no discernable signal during this period. That is, there are equal chances for precipitation during the 2012 monsoon season to be above or below normal.



## 2. Drought Declarations and Designations

The Arizona Department of Water Resources and the Drought Interagency Coordinating Group participate in the process for Drought Emergency Declarations and Disaster Designations for the state.



## **Disaster Designations**

As of August 2011, nine Arizona counties are designated as disaster areas by the U.S. Department of Agriculture (USDA) as a result of drought, wildfires, and high winds. Once designated, farm operators in the designated counties and contiguous counties may be eligible for assistance (low-interest emergency loans or other federal disaster relief) from the Farm Service Agency (FSA). To become designated, the Governor requests the Secretary of the USDA to issue a disaster designation. This request triggers authorization for the FSA to assemble damage assessment reports for analysis. The reports are then forwarded to the USDA with recommendations for consideration. A disaster designation can occur anytime after a request by the Governor.

## **Drought Emergency Declarations**

A Drought Emergency Declaration has been in effect in Arizona since 1999. The current declaration, PCA 99006, issued by the Governor in June 1999 was continued by Executive Order 2007-10. The Drought Interagency Coordinating Group has been responsible for recommendations to the Governor about drought declarations. The declaration maintains the state's ability to provide emergency response if needed, and enables farmers and ranchers to obtain funding assistance through the Farm Service Agency if they experience significant production losses due to drought.

## **3. Drought Preparedness Plan Implementation Highlights**

In early 2011, the part-time coordinator for the statewide drought and community water planning program transferred to another division, resulting in a further reduction of ADWR staff available to help implement and monitor these programs.

### **Drought Planning for Community Water Systems**

Drought planning requirements and water use reporting regulations were recommended in the ADPP and established by the state legislature in 2005 for the purpose of reducing community water systems' drought vulnerability and providing a means for the state to gather water use data. ADWR provides assistance to water providers in meeting these requirements.

#### ***-System Water Plans***

All community water systems are required to submit a System Water Plan every five years. The System Water Plan includes a Water Supply Plan, Conservation Plan and Drought Plan. The first reporting years were 2007 for large systems and 2008 for small systems. Of approximately 800 community water systems in the state, 644 (80%) have System Water Plans that meet statutory requirements. The System Water Plan forms have been modified for 2012 and 2013 so that they are more user-friendly and will be easier to analyze. A section was added so that community water systems can request the following information to help them determine drought stages:

- precipitation data
- weather forecasts
- regional drought conditions
- range and forage conditions
- aquifer levels
- other drought/conservation information

After the forms are submitted and reviewed, ADWR will determine appropriate ways to provide the requested information.

A vulnerability analysis was conducted in 2011 for 200 community water systems based on information contained in the System Water Plans. The 200 systems analyzed represent 95% of the population outside the state's Active Management Areas. The Vulnerability Analysis will attempt to describe the sustainability of water supplies for planning areas, basins and selected communities. The analysis will be included in Chapter 9 (Arizona Water Sustainability Evaluation) of the Arizona Water Atlas, [ADWR - Statewide Planning / Water Atlas](#).

### ***-Annual Water Use Reports***

In 2011, 322 community water systems, representing 85% of the total population outside of the state's Active Management Areas, reported 2010 annual water demand data. (In comparison, 2009 data were received by 358 community water systems, representing 90% of the total population served). ADWR will send a notice at the end of the year to local governing bodies of those providers that have not submitted an Annual Report.

### **Local Drought Impact Group Efforts**

Local Drought Impact Groups (LDIGs) participate in monitoring, education and mitigation on a local level, mainly through cooperative extension and county emergency management programs. Initial planning efforts included ten LDIGs, and eight LDIGs have been active in the past. Since 2008, LDIG focus has been entirely on drought impact monitoring and reporting in an effort to reduce strain on resources, however, only Mohave County and Pima County are currently active.

#### ***-Mohave LDIG*** (see Appendix A for details)

Mohave LDIG meetings were held in January, March, July, and October of 2011, with the March meeting focusing on the visit by the U.S. Drought Mitigation Center. The Mohave LDIG's Drought Impact form is forwarded to the County Emergency Management office, which sends a summary to Arizona DroughtWatch at the first of each month. Opportunities to expand the drought monitoring network to provide more comprehensive coverage are being pursued.

Drought conditions improved in the county in 2011, however, some areas continue to be considerably dryer than others. Conditions across the county as of October varied from normal to unusually dry. Currently, none of the cities have implemented any of their drought plan stages.

The LDIG Mitigation Working Group commenced work on a Drought Mitigation Plan in early 2011. For planning purposes, the county will be divided into zones based on factors such as elevation, topography, vegetation, water sources, and population density. This information will be used to identify trigger points for various drought stages in each of the zones, followed by the identification of potential mitigation measures.

#### ***-Pima LDIG*** (see Appendix B for details)

The Pima County LDIG meets bimonthly to monitor drought conditions, discuss drought impacts and coordinate drought declarations and responses. In 2011, drought conditions persisted in Pima County. The impacts of sustained drought observed include stressed urban landscaping, stressed riparian vegetation, reduced amounts of perennial water available to support wildlife, drying stockponds, and lack of pasture grasses.

However, because the long term status has not worsened appreciably, and increased water levels to Lake Powell and Lake Mead from this winter's snowmelt in the upper Colorado watershed will delay a shortage on the Colorado River by several years, the status of regional drought declarations remains at Stage 1 Alert, unchanged from 2010.

Several water sustainability planning initiatives are underway in Pima County, including updates to the City of Tucson's drought response plan, a climate change mitigation and adaptation plan, and a regional water assessment.

#### ***-National Drought Mitigation Center Visit*** (see Appendix C for details)

In March 2011, staff from the National Drought Mitigation Center along with representatives from the National Weather Service, Arizona State Climate Office and the Drought Watch Program conducted workshops in Kingman, Phoenix and Tucson. The programs were designed to garner feedback from citizens interested in drought conditions, monitoring, online products, and other drought-related issues. The programs covered the following topics:

- Drought monitoring in Arizona and the United States
- Use of citizen drought impact reports by decision makers
- Online drought assessment tools
- U.S.drought-ready communities initiative
- Establishing clear communication channels about current drought impact information.

## **State Drought Monitoring Technical Committee Efforts**

The State Monitoring Technical Committee (MTC) is responsible for gathering drought, climate, and weather data and disseminating that information to land managers, policy-makers and the public. Specifically, the MTC prepares the short and long-term drought status reports, briefs the ICG on drought conditions and provides assistance to Local Drought Impact Groups (LDIGs). The two co-chairs are Nancy Selover, State Climatologist and Gary Woodall, Meteorologist-in-Charge of the National Weather Service Phoenix Office.

### ***-Short-term Drought Status Reporting***

The MTC now confers weekly to advise the U.S. Drought Monitor authors on the current conditions in Arizona and makes recommendations about the position of the drought boundaries for Arizona, as the U.S. Drought Monitor is the official record of drought for Federal drought relief claims.

Information used by the MTC in advising the Drought Monitor authors includes numerous drought indices, precipitation and stream flow data, and impacts data. The MTC, and particularly Michael Crimmins at the University of Arizona, has worked on improvements to the Arizona DroughtWatch website [www.azdroughtwatch.org](http://www.azdroughtwatch.org), where drought impacts can be reported directly into the impacts database, and will be linked automatically to the National Drought Impacts Reporter.

### ***-Arizona DroughtWatch***

Arizona DroughtWatch (AZDW) is a pilot, volunteer drought impact monitoring program that has been developed to systematically collect qualitative observations of drought impacts to support drought status determination and local drought vulnerability assessments. Historically, drought monitoring and the calculation of drought status have been based solely on sparse networks of hydroclimatological data collected across the state. Qualitative observations of drought impacts in conjunction with these data offer the promise of a better and more nuanced characterization of drought, given Arizona's complex and highly variable climate. The web-based reporting system allows observers to create accounts and submit impact observations for multiple locations on a monthly basis. These observations are summarized and displayed anonymously in maps and tables on the open website. The beta system, launched in 2009, has collected several hundred individual drought impact observations that have been instrumental in both ground-truthing and adjusting state and national drought status maps. Work is underway to connect Arizona DroughtWatch to the National Drought Impacts Reporter to ensure seamless data sharing in support of national efforts like NIDIS.

### ***-Community Collaborative Rain Hail and Snow (CoCoRaHS) Network***

Arizona joined the CoCoRaHS network in 2009 so that our volunteer citizen precipitation observers could communicate their precipitation measurements to the National Weather Service along with over 10,000 observers from other states. The data collected are important in our drought monitoring as well as flood warning. This past year, CoCoRaHS has added drought impacts reporting to their website, enabling our 700-plus observers in Arizona to efficiently add their drought impact observations to their precipitation observations. The data go directly to the Drought Impacts Reporter.

### ***-ADWR Drought Index Wells***

The MTC plans on further assessment of statewide groundwater index wells to identify and incorporate data that meet the criteria for drought index wells. Drought index wells serve as a supplement to existing drought indicators and help establish drought status for watersheds where either precipitation or stream flow data are lacking.

### ***-Communicating Drought Status***

Improving the accessibility of drought information to resource managers, state decision-makers and the public is a primary goal of the MTC and ADWR. To further communication, information is updated on the ADWR Drought Status webpage on a weekly, monthly and quarterly basis:

*Weekly* - On a weekly basis, the ADWR Drought Status webpage (<http://www.azwater.gov/azdwr/StatewidePlanning/Drought/default.htm>) is updated with the

latest version of the Arizona map produced by the U.S. Drought Monitor. The MTC analyzes local hydroclimatic conditions and impacts occurring in Arizona and provides this information to the U.S. Drought Monitor.

*Monthly* - At the end of each month, the MTC produces a web-based, short-term drought status update based on U.S. Drought Monitor's maps for the past four weeks. An e-mail with the latest map and summary is sent to interested parties.

*Quarterly* - On a quarterly basis, the MTC continues to meet and produce a long-term drought status map and summary report, which incorporates the 24-, 36- and 48-month precipitation and streamflow percentiles for major Arizona watersheds (i.e., 4-digit U.S. Geological Survey Hydrologic Unit Code). Vegetation indices, snowpack, temperature, reservoir levels, and county-scale drought impact information are used to verify or modify the result of the calculations. The long-term drought status reports are posted on the ADWR website and disseminated via email in May (for January – March), August (for April – June), November (for July – September) and February for October – December.)

See Appendix D for the “Method for Determining Long-term Drought Status.”

These monthly and quarterly reports serve as an information resource for the public and as a planning tool for resource managers developing mitigation and response strategies.

#### ***-Change in Method for Determining Drought Categories***

As of January 2011, the MTC changed the percentiles of precipitation and streamflow represented by the drought categories from beginning below the 40<sup>th</sup> percentile to beginning below the 30<sup>th</sup> percentile. Since Arizona is an arid state, and precipitation and streamflow frequently fall between the 30th and 40th percentiles, beginning drought in that range caused some watersheds to bounce in and out of drought categories, while conditions on the ground may not have supported the drought condition. Old and new ranges are shown in the table below:

Drought Category	Old percentile range	New percentile range
DO - Abnormally Dry	25-40	21-30
D1 - Moderate Drought	16-25	11-20
D2 – Severe Drought	6-15	6-10
D3 – Extreme Drought	1-5	2-5
D4 – Exceptional Drought	NA	1-2

In addition to better reflecting actual drought rather than our normal precipitation variability, maps will be more consistent with the U.S. Drought Monitor maps that also use these percentile ranges.

#### ***- Calculating the Standardized Precipitation Index***

The State Climatologist is working on the use of gridded data for calculating the Standardized Precipitation Index and the drought status to improve the resolution and timeliness of the maps produced by the MTC. This is a resource issue as there have been cutbacks on the State Climate Office.

#### ***- Funding and Resource Needs***

The MTC has identified the following two funding and resource needs, as previously stated in the 2007 through 2010 annual reports:

1. *Development of a strategic plan to identify data gaps and monitoring needs*  
Arizona's current network of meteorological and hydrological observations for drought monitoring lacks sufficient spatial resolution to accurately characterize drought status at the local level requested by stakeholders throughout the state. Improving the spatial, temporal and altitudinal resolution of Arizona's drought monitoring network will improve the Committee's ability to serve the needs of Arizona stakeholders, including the local drought impact groups. In particular, Arizona faces the following conspicuous data gaps:



- Complete lack of soil moisture monitoring
- Few high elevation meteorological monitoring stations
- Constantly decreasing network of streamflow gages

Although the MTC has identified these data gaps in general terms, it is imperative to conduct a systematic evaluation in order to characterize and prioritize these numerous data and observation gaps. A strategic plan, with carefully considered criteria for prioritization, is essential for making state funding requests and for taking advantage of federal funding opportunities. The MTC recommends funding to develop a strategic plan, conduct data and observation gap analyses, and document priority locations using geographic information system technology.

*Total cost: \$9,000*

2. *Incorporation of groundwater data for drought status determination*

ADWR staff has evaluated groundwater level changes around the state. However, further analysis is needed to determine what role drought plays in these observed changes. Incorporating groundwater level trend data will be critical in determining drought conditions and impacts on water supply. When the state budget allows, the MTC recommends funding for ADWR staff salaries to conduct groundwater analyses.

*Total cost: \$38,000 per year*

### **Interagency Coordinating Group Efforts**

The Interagency Coordinating Group (ICG) has met biannually since 2006 and advises the Governor on drought status, impacts and any necessary preparedness and response actions. The meetings include a review of statewide monitoring efforts and drought status, water supply updates, rangeland conditions, forest health and the impacts of drought on wildlife. At both the November 2010 and May 2011 meetings, the ICG recommended to the Governor that the state's Drought Emergency Declaration (PCA 99006) and the Drought Declaration for the State of Arizona issued May 2007 (Executive Order 2007-10) be continued. The presentations and subsequent decisions are on ADWR's web site at <http://www.azwater.gov/AzDWR/StatewidePlanning/Drought/ICG.htm>.

## **4. Conservation Program Highlights**

ADWR's Conservation Program provides an integrated approach to water conservation by combining regulations, assistance, outreach and education. ADWR works to achieve the mission of promoting and encouraging the wise and efficient use of water throughout Arizona by developing conservation tools and resources, assisting Arizona communities and water providers, collaborating with regional and national partners, and participating in outreach activities. Although many conservation activities have been curtailed as a result of the 2010 reduction in force and the transfer to another division in 2011 of one of the two staff working on conservation, efforts continue in the areas described below.

### **Water Conservation Toolkit**

The conservation section of ADWR's website ([www.azwater.gov/conservation](http://www.azwater.gov/conservation)) continues to be maintained, as it provides an assembly of tools developed to assist residents, businesses, communities and water providers in the design and implementation of comprehensive and proven conservation strategies.

ADWR plans to develop new tools for municipal water providers that focus on the best management practices (BMPs) most frequently implemented by the 55 providers in Active Management Areas regulated under the Modified Non-per Capita Conservation Program (MNPCCP). Results of their Conservation Efforts Reports submitted in 2011 indicate that water providers would benefit from additional information about the following BMPs:

- Basic public education on water conservation

- Meter repair and replacement programs
- Customer high water-use inquiry resolution
- Customer high water-use notification.

Information sheets with case studies about these BMPs would serve as a resource for water providers statewide. The October 2011 MNPCCP annual progress report can be found at [www.azwater.gov/mnpccp](http://www.azwater.gov/mnpccp).

## **Collaboration and Outreach**

Another large component of ADWR's Conservation Program is collaboration and outreach to raise public awareness about water efficiency and help create a culture of conservation around the state. To this end, ADWR staff continues to participate in conservation efforts of groups such as the Arizona Municipal Water Users Association (AMWUA) and the Statewide Conservation Information Group. By combining voluntary initiatives with regulatory goals, ADWR is focused on creating a more integrated approach to water conservation. Examples of collaborative efforts include the following:

### ***-Water Awareness Month***

Arizona celebrated its 3<sup>rd</sup> year of Water Awareness Month (WAM) by promoting statewide water conservation activities, events and resources through a collaborative social media campaign. The theme for WAM 2011 was "AWARENESS -- of water conservation issues in our state -- and our call-to-action was for Arizona residents to use water more efficiently, become aware of water conservation activities in their region, and know where to turn for information and resources.



Working in collaboration with AMWUA, an interactive, web-based calendar for April 2011 was developed as a portal (or information hub) with its own independent website, <http://www.waterawarenessmonth.com>. The calendar served as the "landing site" for all WAM inquiries, with connections to activities, resources and tips related to the theme of each day, and a place for people to make a pledge about water conservation. The WAM website also included links to the WAM Facebook and Twitter accounts. Appendix E includes an article about WAM that was published by the University of Arizona Water Resources Research Center.

### ***-LandscapewithStyle.com***

ADWR and the AMWUA collaborated on transforming the book *Xeriscape: Landscaping with Style in the Sonoran Desert* into a web-based interactive guide for designing, installing and maintaining a low water-use landscape, making the resource readily available statewide.

[www.landscapewithstyle.com](http://www.landscapewithstyle.com)



### ***-Summary of Municipal Conservation Programs in Arizona***

ADWR updates the *Summary of Municipal Water Conservation Programs in Arizona* as a resource for municipal water providers and other organizations wishing to begin or expand their water conservation programs. In addition to serving as a resource, the summary is an ongoing record of the conservation programs implemented by Arizona municipal water providers.

### ***-Building Water Efficiency (water conservation website for facility managers)***

ADWR is participating in the development of the web adaptation of AMWUA's water conservation guide for facility managers. This independent website will provide Arizona-specific information that is searchable and customizable for a variety of commercial and industrial applications, and will be useful statewide.